

09/783031

(FILE 'HOME' ENTERED AT 11:52:03 ON 30 NOV 2001)

FILE 'HCAPLUS' ENTERED AT 11:52:09 ON 30 NOV 2001

L1 23988 S SUPERCRITICAL  
L2 607109 S TRIGLYCERIDE OR GLYCERIDE FAT OR OIL  
L3 698309 S CATALYST  
L4 49626 S NICKEL AND L3  
L5 18 S L1 AND L2 AND L4

FILE 'STNGUIDE' ENTERED AT 11:54:23 ON 30 NOV 2001

FILE 'HCAPLUS' ENTERED AT 12:00:01 ON 30 NOV 2001

L6 1 S ES2124166/PN  
L7 138 S L1 AND L2 AND L3  
L8 16 S L7 AND (ALCOHOL OR MONOALCOHOL OR MONO-ALCOHOL)

L5 ANSWER 1 OF 18 HCAPLUS COPYRIGHT 2001 ACS  
 AN 2001:615572 HCAPLUS  
 DN 135:182359  
 TI Process for producing fatty acid esters and fuels comprising fatty acid ester  
 IN Tateno, Tatsuo; Sasaki, Toshio  
 PA Sumitomo Chemical Company, Limited, Japan  
 SO Eur. Pat. Appl., 10 pp.  
 CODEN: EPXXDW  
 DT Patent  
 LA English  
 IC ICM C11C003-00  
 ICS C10L001-18; C07C067-03; B01J003-00  
 CC 45-3 (Industrial Organic Chemicals, Leather, Fats, and Waxes)  
 FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	EP 1126011	A2	20010822	EP 2001-1103503	20010215
	EP 1126011	A3	20010829		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	JP 2001226694	A2	20010821	JP 2000-39318	20000217
	JP 2001302584	A2	20011031	JP 2001-41393	20010219
PRAI	JP 2000-39316	A	20000217		
	JP 2000-39318	A	20000217		
AB	The process for producing a fatty acid ester with a high yield from an oil or fat (soybean oil) and an alc. (MeOH) which comprises reacting an oil or fat with an alc. in the presence of a solid base <b>catalyst</b> (anhyd. Na carbonate) under conditions in which .gtoreq.1 of the oil or fat and the alc. is in a <b>supercrit.</b> state at a temp. >260.degree.C.				
ST	soybean oil ester fuel; sodium carbonate <b>catalyst</b> fatty acid ester; <b>supercrit</b> state fatty acid ester				
IT	Fatty acids, preparation RL: IMF (Industrial manufacture); PREP (Preparation) (esters; process for producing fatty acid esters and fuels comprising fatty acid ester)				
IT	Fuels <b>Supercritical</b> phenomena (process for producing fatty acid esters and fuels comprising fatty acid ester)				
IT	Soybean oil RL: IMF (Industrial manufacture); PREP (Preparation) (reaction products with alcs.; process for producing fatty acid esters and fuels comprising fatty acid ester)				
IT	471-34-1, Calcium carbonate, uses 497-19-8, Sodium carbonate, uses 1305-62-0, Calcium hydroxide, uses 1305-78-8, Calcium oxide, uses 1309-48-4, Magnesium oxide, uses 1313-99-1, <b>Nickel</b> oxide, uses RL: CAT (Catalyst use); USES (Uses) (process for producing fatty acid esters and fuels comprising fatty acid ester)				
IT	67-56-1DP, Methanol, reaction products with oil and fat RL: IMF (Industrial manufacture); PREP (Preparation) (process for producing fatty acid esters and fuels comprising fatty acid ester)				

L5 ANSWER 2 OF 18 HCAPLUS COPYRIGHT 2001 ACS

AN 2001:603741 HCAPLUS  
 DN 135:182358  
 TI Manufacture of fatty acid esters and fuel containing the fatty acid esters  
 IN Tateno, Tatsuo; Sasaki, Toshio  
 PA Sumitomo Chemical Co., Ltd., Japan  
 SO Jpn. Kokai Tokkyo Koho, 7 pp.  
 CODEN: JKXXAF  
 DT Patent  
 LA Japanese  
 IC ICM C11C003-10  
 ICS B01J023-755; C07B061-00; C07C067-03; C07C069-58; C10L001-02; C10L001-08; C10L001-18; C10M105-34; C11B013-00; C10N040-25  
 CC 45-3 (Industrial Organic Chemicals, Leather, Fats, and Waxes)  
 Section cross-reference(s): 51  
 FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2001226694	A2	20010821	JP 2000-39318	20000217
	EP 1126011	A2	20010822	EP 2001-1103503	20010215
	EP 1126011	A3	20010829		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	US 2001042340	A1	20011122	US 2001-783031	20010215
PRAI	JP 2000-39316	A	20000217		
	JP 2000-39318	A	20000217		
OS	MARPAT 135:182358				
AB	The esters useful fuels, diesel fuels, lube oil base or fuel additives are manufd. by reacting oils and fats with alcs. using an Ni-contg. solid catalyst under supercrit. condition. Heating 0.861 g soya oil, 1.242 g MeOH, and 10.9 mg NiO-Ni2O3 mixt. in a stainless reactor at 300.degree. for 10 min gave 98% yield soya fatty acid Me esters and 91% yield glycerol.				
ST	fatty acid ester manuf fuel; nickel catalyst fat oil transesterification; soya fatty acid Me ester manuf				
IT	Lubricating oils (base; manuf. of fatty acid esters and fuel contg. the fatty acid esters)				
IT	Fatty acids, preparation RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (esters; manuf. of fatty acid esters and fuel contg. the fatty acid esters)				
IT	Diesel fuel Fuel additives Fuels Transesterification catalysts (manuf. of fatty acid esters and fuel contg. the fatty acid esters)				
IT	Alcohols, reactions Soybean oil RL: RCT (Reactant) (manuf. of fatty acid esters and fuel contg. the fatty acid esters)				
IT	Wastes (oil, reactants; manuf. of fatty acid esters and fuel contg. the fatty acid esters)				
IT	Fats and Glyceridic oils, reactions RL: RCT (Reactant) (oils; manuf. of fatty acid esters and fuel contg. the fatty acid esters)				

acid esters)

IT Fatty acids, preparation  
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (soya, Me esters; manuf. of fatty acid esters and fuel contg. the fatty acid esters)

IT 56-81-5P, Glycerol, preparation  
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (manuf. of fatty acid esters and fuel contg. the fatty acid esters)

IT 67-56-1, Methanol, reactions  
 RL: RCT (Reactant)  
 (manuf. of fatty acid esters and fuel contg. the fatty acid esters)

IT 1313-99-1, **Nickel** oxide, uses 1314-06-3, **Nickel** trioxide  
 RL: CAT (Catalyst use); USES (Uses)  
 (transesterification **catalysts**; manuf. of fatty acid esters and fuel contg. the fatty acid esters)

L5 ANSWER 3 OF 18 HCAPLUS COPYRIGHT 2001 ACS  
 AN 2001:409893 HCAPLUS  
 DN 135:197151  
 TI **Nickel**-alumina composite aerogels as liquid-phase hydrogenation **catalysts**  
 AU Suh, D. J.; Park, T.-J.; Lee, S.-H.; Kim, K.-L.  
 CS Clean Technology Research Center, Korea Institute of Science and Technology, Cheongryang, Seoul, 136-791, S. Korea  
 SO J. Non-Cryst. Solids (2001), 285(1-3), 309-316  
 CODEN: JNCSBJ; ISSN: 0022-3093  
 PB Elsevier Science B.V.  
 DT Journal  
 LA English  
 CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)  
 AB Mesoporous and well-dispersed **nickel**-alumina composite aerogels with high surface area have been prep'd. by CO2 **supercrit.** drying of alcogels obtained by the fast sol-gel process. They were evaluated as **catalysts** in a batch reactor for the liq.-phase hydrogenation of benzophenone and soybean oil and showed excellent activity and accessibility of the metal particles. They were also characterized by nitrogen adsorption-desorption, X-ray diffraction (XRD), XPS (XPS), and transmission electron microscopy (TEM) to explain their excellent catalytic performance in comparison with other alumina-supported **nickel catalysts**.  
 ST **nickel** alumina aerogel liq phase hydrogenation **catalyst** ; benzophenone soybean oil hydrogenation  
 IT Soybean oil  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (hydrogenated; **nickel**-alumina composite aerogels as liq.-phase hydrogenation **catalysts** of soybean oil)  
 IT Sol-gel processing  
 (in prepn. of **nickel**-alumina composite aerogels as liq.-phase hydrogenation **catalysts**)  
 IT Hydrogenation **catalysts**  
 (liq.-phase; **nickel**-alumina composite aerogels as liq.-phase hydrogenation **catalysts**)  
 IT Aerogels  
 (**nickel**-alumina composite aerogels as liq.-phase

hydrogenation **catalysts**)

IT Soybean oil  
 RL: RCT (Reactant)  
 (**nickel**-alumina composite aerogels as liq.-phase hydrogenation **catalysts** of soybean oil)

IT Microstructure  
 Pore size  
 Surface area  
 X-ray photoelectron spectra  
 (of **nickel**-alumina composite aerogels as liq.-phase hydrogenation **catalysts**)

IT 373-02-4, **Nickel** acetate  
 RL: CAT (Catalyst use); USES (Uses)  
 (in sol-gel process with aluminum sec-butoxide; **nickel**-alumina composite aerogels as liq.-phase hydrogenation **catalysts**)

IT 2269-22-9  
 RL: CAT (Catalyst use); USES (Uses)  
 (in sol-gel process with **nickel** acetate; **nickel**-alumina composite aerogels as liq.-phase hydrogenation **catalysts**)

IT 13138-45-9, **Nickel** nitrate  
 RL: CAT (Catalyst use); USES (Uses)  
 (**nickel**-alumina composite aerogels as liq.-phase hydrogenation **catalysts**)

IT 119-61-9, Benzophenone, reactions  
 RL: RCT (Reactant)  
 (**nickel**-alumina composite aerogels as liq.-phase hydrogenation **catalysts** for benzophenone)

IT 91-01-0P, Benzhydrol  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)  
 (**nickel**-alumina composite aerogels as liq.-phase hydrogenation **catalysts** for benzophenone)

IT 101-81-5P, Diphenylmethane  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (**nickel**-alumina composite aerogels as liq.-phase hydrogenation **catalysts** for benzophenone)

IT 1344-28-1, .gamma.-Alumina, uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (.gamma.- **catalyst** support; **nickel**-alumina composite aerogels as liq.-phase hydrogenation **catalysts**)

RE.CNT 11

RE

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- (3) Kim, J; Appl Catal A 2000, V197, P191 HCAPLUS
- (4) Kumbhar, P; Catal Lett 1991, V10, P131 HCAPLUS
- (5) Kumbhar, P; Stud Surf Sci Catal 1993, V78, P251 HCAPLUS
- (6) Pajonk, G; Catal Today 1997, V35, P319 HCAPLUS
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- (10) Suh, D; J Non-Cryst Solids 1998, V225, P168 HCAPLUS
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L5 ANSWER 4 OF 18 HCAPLUS COPYRIGHT 2001 ACS  
 AN 2001:169729 HCAPLUS  
 DN 134:352501

TI Hydrogenation of vegetable **oils** using mixtures of **supercritical** carbon dioxide and hydrogen  
 AU King, Jerry W.; Holliday, Russell L.; List, Gary R.; Snyder, Janet M.  
 CS Food Quality and Safety Research Unit, NCAUR, ARS, USDA, Peoria, IL, 61604, USA  
 SO J. Am. Oil Chem. Soc. (2001), 78(2), 107-113  
 CODEN: JAOCA7; ISSN: 0003-021X  
 PB AOCS Press  
 DT Journal  
 LA English  
 CC 17-9 (Food and Feed Chemistry)  
 AB Hydrogenation of vegetable **oils** under **supercrit.** conditions can involve a homogeneous one-phase system, or alternatively 2 **supercrit.** components in the presence of a condensed phase consisting of **oil** and a solid **catalyst**. The former operation is usually conducted in flow reactors while the latter mode is more amenable to stirred, batch-reactor technol. Although many advantages have been cited for the 1-phase hydrogenation of **oils** or oleochems. using **supercrit.** carbon dioxide or propane, its ultimate productivity is limited by the **oil** soly. in the **supercrit.** fluid phase as well as unconventional conditions that affect the hydrogenation. In this study, a dead-end reactor has been utilized in conjunction with a head-space consisting of either a binary fluid phase consisting of varying amts. of carbon dioxide mixed with hydrogen or neat hydrogen for comparison purposes. Reaction pressures up to 2000 psi and temps. in the range of 120-140.degree.C have been utilized with a conventional **nickel catalyst** to hydrogenate soybean **oil**. Depending on the chosen reaction conditions, a wide variety of end products can be produced having different iodine values, percentage trans fatty acid content, and dropping points or solid fat indexes. Although addn. of carbon dioxide to the fluid phase contg. hydrogen retards the overall reaction rate in most of the studied cases, the majority of products have low trans fatty acid content, consistent with a nonselective mode of hydrogenation.  
 ST vegetable **oil** hydrogenation **supercrit** carbon dioxide  
 IT **Catalysts**  
 (hydrogenation of vegetable **oils** using mixts. of **supercrit.** carbon dioxide and hydrogen)  
 IT Soybean **oil**  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (hydrogenation of, using mixts. of **supercrit.** carbon dioxide and hydrogen)  
 IT Hydrogenation  
 (of vegetable **oils** using mixts. of **supercrit.** carbon dioxide and hydrogen)  
 IT Extraction  
 (**supercrit.**; hydrogenation of vegetable **oils** using mixts. of **supercrit.** carbon dioxide and hydrogen)  
 IT Fatty acids, biological studies  
 RL: BOC (Biological occurrence); BIOL (Biological study); OCCU (Occurrence)  
 (unsatd., trans-; hydrogenation of vegetable **oils** using mixts. of **supercrit.** carbon dioxide and hydrogen)  
 IT Fats and Glyceridic **oils**, processes  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (vegetable; hydrogenation of, using mixts. of **supercrit.**

carbon dioxide and hydrogen)

IT 12408-02-5, Hydrogen ion, biological studies  
 RL: BUU (Biological use, unclassified); BIOL (Biological study); USES  
 (Uses)  
 (hydrogenation of vegetable oils using mixts. of  
**supercrit.** carbon dioxide and)

IT 124-38-9, Carbon dioxide, biological studies  
 RL: BUU (Biological use, unclassified); BIOL (Biological study); USES  
 (Uses)  
 (hydrogenation of vegetable oils using mixts. of  
**supercrit.** carbon dioxide and hydrogen)

RE.CNT 25

RE

- (1) Albright, L; Hydrogenation; Proceedings of an AOCS Colloquium 1987, P12
- (2) Albright, L; J Am Oil Chem Soc 1962, V39, P14 HCAPLUS
- (3) Andersson, M; Proceedings of the 6th Meeting on Supercritical Fluids 1999, P195
- (4) Anon; Official and Recommended Methods of the American Oil Chemists' Society 1989, Methods Cc-18-80, Cd-10-57
- (5) Bertucco, A; Ind Eng Chem Res 1997, V36, P2626 HCAPLUS
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- (7) Harrod, M; WO 96/01304 1996 HCAPLUS
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- (14) Koritala, S; J Am Oil Chem Soc 1980, V57, P1 HCAPLUS
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- (17) Mounts, T; J Am Oil Chem Soc 1978, V55, P402 HCAPLUS
- (18) Patterson, H; Hydrogenation of Fats and Oils: Theory and Practice 1994, P39
- (19) Susu, A; J Am Oil Chem Soc 1981, V58, P657 HCAPLUS
- (20) Tacke, T; US 5734070 1998 HCAPLUS
- (21) Tacke, T; High-Pressure Chemical Engineering 1996, P17 HCAPLUS
- (22) Tacke, T; Proceedings of the 4th International Symposium on Supercritical Fluid 1997, P511
- (23) Temelli, F; J Am Oil Chem Soc 1996, V73, P699 HCAPLUS
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- (25) Van den Hark, S; J Am Oil Chem Soc 1999, V76, P1363 HCAPLUS

L5 ANSWER 5 OF 18 HCAPLUS COPYRIGHT 2001 ACS

AN 2000:28872 HCAPLUS

DN 132:66387

TI Applicability of **supercritical** water as a reaction medium for desulfurization and demetallization of gas oil

AU Vogelaar, B. M.; Makkee, M.; Moulijn, J. A.

CS Section Industrial Catalysis, Department of Chemical Process Technology, Faculty of Applied Sciences, Delft University of Technology, Delft, 2628 BL, Neth.

SO Fuel Process. Technol. (1999), 61(3), 265-277  
 CODEN: FPTEDY; ISSN: 0378-3820

PB Elsevier Science B.V.

DT Journal  
LA English  
CC 51-9 (Fossil Fuels, Derivatives, and Related Products)  
AB In this study, the potential of **supercrit.** water (SCW) was investigated, to remove sulfur and metals from gas **oil**, either sep. or simultaneously. The expts. were carried out in a stirred batch autoclave at 673 K and 25 MPa, using a std. hydrotreated gas **oil** spiked with different sulfur-, **nickel**- and vanadium-contg. model compds. Only non-arom. sulfur compds. will react in SCW. The obsd. degree of desulfurization is marginal. Arom. sulfur compds. are too stable and will not react. Demetallization of selected metal complexes was not obsd. The metal complexes undergo some rearrangements in SCW,

but

their basic structure remains intact. Desulfurization and demetallization were only obsd. in the presence of a conventional hydrotreating **catalyst**. Concluding, SCW alone is not a suitable reaction medium for desulfurization and/or demetallization of gas **oil**. This conclusion is supported by thermodynamical calcns.

ST gas **oil** desulfurization demetallization **supercrit** water

IT Petroleum refining  
(demetalation; **supercrit.** water as a reaction medium for desulfurization and demetallization of gas **oil**)

IT Petroleum refining  
(desulfurization; **supercrit.** water as a reaction medium for desulfurization and demetallization of gas **oil**)

IT Gas **oils**  
(**supercrit.** water as a reaction medium for desulfurization and demetallization of gas **oil**)

IT 7732-18-5, Water, uses  
RL: ARG (Analytical reagent use); ARU (Analytical role, unclassified); ANST (Analytical study); USES (Uses)  
(**supercrit.** water as a reaction medium for desulfurization and demetallization of gas **oil**)

RE.CNT 15

RE

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- (2) Azzam, F; Fuel Science and Technology International 1993, V11(7), P951 HCAPLUS
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- (4) Katritzky, A; Energy and Fuels 1990, V4, P577 HCAPLUS
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- (6) Katritzky, A; Energy and Fuels 1992, V6, P431 HCAPLUS
- (7) Katritzky, A; Energy and Fuels 1992, V4, P562
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AN 1999:687344 HCAPLUS  
 DN 132:22223  
 TI Hydrogenation of edible **oil**  
 AU Takahashi, Yoshikazu; Yoda, Minoru  
 CS Miyoshi Oil & Fat Co., Ltd., Horikiri, Katsushika-ku, Tokyo, 124-8510, Japan  
 SO Nihon Yukagakkaishi (1999), 48(10), 1141-1149  
 CODEN: NIYUFC; ISSN: 1341-8327  
 PB Nihon Yukagaku Gakkai  
 DT Journal; General Review  
 LA Japanese  
 CC 17-0 (Food and Feed Chemistry)  
 AB A review with 36 refs. The hydrogenation of edible **oil** is a basic means for converting liq. **oils** into plastic fats at **oil** and fat companies. Fundamental hydrogenation and current continuous reactor using a fixed-bed **catalyst** and **supercrit.** process are discussed. New types of **nickel** and precious metal **catalysts** and current developments in reactors are presented.  
 ST review edible **oil** fat hydrogenation  
 IT Fats and Glyceridic **oils**, biological studies  
 RL: FFD (Food or feed use); IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); BIOL (Biological study); PREP (Preparation); PROC (Process); USES (Uses)  
 (hydrogenated; hydrogenation of edible **oil**)  
 IT Food processing  
 Hydrogenation  
 (hydrogenation of edible **oil**)  
 IT Edible **oils**  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (hydrogenation of edible **oil**)

L5 ANSWER 7 OF 18 HCAPLUS COPYRIGHT 2001 ACS  
 AN 1999:618420 HCAPLUS  
 DN 131:288550  
 TI Deactivation of NiMo/.gamma.-Al<sub>2</sub>O<sub>3</sub> **catalysts** for hydrodesulfurization of heavy **oil**  
 AU Su, Ji-xin; Xiao, Tian-cun; Wang, Hai-tao; Yin, Yong-quan; Lu, Yu-li; Yang, Zhao-he  
 CS Department of Environmental Engineering, Shandong University, Jinan, 250100, Peop. Rep. China  
 SO Fenzi Cuihua (1999), 13(4), 297-303  
 CODEN: FECUEN; ISSN: 1001-3555  
 PB Kexue Chubanshe  
 DT Journal  
 LA Chinese  
 CC 51-6 (Fossil Fuels, Derivatives, and Related Products)  
 AB Spent industrial **catalyst** samples for hydrodesulfurization (HDS) of heavy **oil** were collected and treated by ultrasonic washing and **supercrit.** fluid extn. The samples were characterized by mean of various techniques: TPO-MS, TG, DTA, SEM-EDS, x-ray diffraction and TPR, and the reasons for the deactivation of the **catalyst** were studied. It's shown that, deposited carbon and deposited metals on the **catalysts** were the main factors resulting in the deactivation, and state of the active elements on the **catalysts** can be restored and improved by removing the deposited carbon and deposited metals. The method used to unload the deactivated **catalysts** from industrial reactor also has some effect on their

chemicophys. properties.

ST deactivation molybdenum **nickel** alumina **catalyst**  
hydrodesulfurization

IT Decoking  
Hydrodesulfurization  
Hydrodesulfurization **catalysts**  
(deactivation of NiMo/.gamma.-Al2O3 **catalysts** for  
hydrodesulfurization of heavy oil)

IT 1344-28-1, Alumina, uses 7439-98-7, Molybdenum, uses 7440-02-0,  
**Nickel**, uses  
RL: CAT (Catalyst use); USES (Uses)  
(deactivation of NiMo/.gamma.-Al2O3 **catalysts** for  
hydrodesulfurization of heavy oil)

IT 7440-44-0, Carbon, reactions  
RL: FMU (Formation, unclassified); RCT (Reactant); REM (Removal or  
disposal); FORM (Formation, nonpreparative); PROC (Process)  
(deactivation of NiMo/.gamma.-Al2O3 **catalysts** for  
hydrodesulfurization of heavy oil)

L5 ANSWER 8 OF 18 HCAPLUS COPYRIGHT 2001 ACS  
AN 1999:524973 HCAPLUS  
DN 131:173666  
TI Sol-gel synthesis and characterization of various oxide aerogels and NiO  
and Pd supported on aerogels  
AU Knez, Zeljko; Novak, Z.  
CS Faculty Chemistry Chemical Engineering, Univ. Maribor, Maribor, SI-2000,  
Slovenia  
SO Wiss. Ber. - Forschungszent. Karlsruhe (1999), FZKA 6271, High Pressure  
Chemical Engineering, 133-136  
CODEN: WBFKF5; ISSN: 0947-8620  
DT Report  
LA English  
CC 57-2 (Ceramics)  
Section cross-reference(s): 66, 67  
AB The prepn. and characterization of aerogels of metal oxides (SiO2, Al2O3,  
and TiO2), binary mixed oxides (SiO2-Al2O3 and SiO2-TiO2), and various  
NiO  
aerogels (NiO-Al2O3, NiO-SiO2, and NiO-SiO2-Al2O3), and Pd aerogels  
(Pd-Al2O3 and Pd-SiO2-Al2O3) is presented. The prepn. of aerogels  
includes several steps: sol-gel synthesis, drying and, finally, thermal  
treatment. Excellent properties of aerogels, obtained with the sol-gel  
synthesis, were preserved with **supercrit.** drying with CO2. Due  
to this fact, **supercrit.** drying was carried out at the  
conditions above the binary crit. curve of the solvent - CO2, where the  
solvent and CO2 are completely miscible. All produced aerogels were  
characterized by N physisorption at 77 K, single point BET surface area  
measurements (adsorption of Ar-N gas mixt.), x-ray diffraction, and  
thermal anal.

ST silica alumina aerogel sol gel **supercrit** drying carbon oxide;  
titania aerogel sol gel **supercrit** drying carbon oxide; palladium  
**nickel** oxide aerogel support sol gel

IT Aerogels  
Sol-gel processing  
(sol-gel processing and characterization of various oxide aerogels and  
NiO and Pd supported on aerogels)

IT Surface area  
Thermal decomposition  
(sol-gel processing and characterization of various oxide aerogels and

- NiO and Pd supported on aerogels in relation to)
- IT Hydrogenation **catalysts**  
(sol-gel processing and characterization of various oxide aerogels and NiO and Pd supported on aerogels used as)
- IT Soybean oil  
RL: NUU (Nonbiological use, unclassified); USES (Uses)  
(sol-gel processing and characterization of various oxide aerogels and NiO and Pd supported on aerogels used as hydrogenation **catalysts** of)
- IT Drying  
(**supercrit.**; sol-gel processing and characterization of various oxide aerogels and NiO and Pd supported on aerogels in relation to)
- IT 7440-05-3, Palladium, properties  
RL: CAT (Catalyst use); PRP (Properties); USES (Uses)  
(sol-gel processing and characterization of various oxide aerogels and NiO and Pd supported on aerogels)
- IT 1344-28-1, Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>), processes 7631-86-9, Silica, processes 13463-67-7, Titania, processes 52337-09-4, Silicon titanium oxide 159995-97-8, Aluminum silicon oxide  
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)  
(sol-gel processing and characterization of various oxide aerogels and NiO and Pd supported on aerogels)
- IT 1313-99-1, **Nickel** oxide (NiO), properties  
RL: PRP (Properties)  
(sol-gel processing and characterization of various oxide aerogels and NiO and Pd supported on aerogels)
- IT 124-38-9, Carbon dioxide, uses  
RL: NUU (Nonbiological use, unclassified); USES (Uses)  
(sol-gel processing and characterization of various oxide aerogels and NiO and Pd supported on aerogels in relation to **supercrit.** drying with)

RE.CNT 14

RE

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Springer Proceedings in Physic 1986, V6
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- (14) Zarzycki, J; Aerogels, Proceedings of the 1st International Symp on Aerogels, Springer Proceedings in Physic 1986, V6, P42 HCAPLUS

L5 ANSWER 9 OF 18 HCAPLUS COPYRIGHT 2001 ACS  
 AN 1999:491579 HCAPLUS  
 DN 131:187128  
 TI Coking of Hydroprocessing **Catalyst** by Residue Fractions of Bitumen  
 AU Gray, Murray R.; Zhao, Yingxian; McKnight, Craig M.; Komar, David A.; Carruthers, J. Donald  
 CS Department of Chemical and Materials Engineering, University of Alberta, Edmonton, AB, T6G 2G6, Can.  
 SO Energy Fuels (1999), 13(5), 1037-1045  
 CODEN: ENFUEM; ISSN: 0887-0624  
 PB American Chemical Society  
 DT Journal  
 LA English  
 CC 51-10 (Fossil Fuels, Derivatives, and Related Products)  
 AB The deposition of org. material, or coke, on hydroprocessing **catalyst** was studied using Athabasca bitumen vacuum residue (ABVB) and narrow fractions of ABVB, prepd. by **supercrit.** fluid extn. (SCFE) with n-pentane. The feed materials were dild. in a low-sulfur gas oil and hydroprocessed over a com. Ni-Mo/.gamma.-Al2O3 **catalyst** in a 1 L continuous-stirred tank reactor at 440 .degree.C. The coked **catalysts** were Soxhlet extd. with methylene chloride; then, carbon content, surface area, pore vol., and pore size were measured. Hydrodesulfurization activity was then measured using bitumen and dibenzothiophene as reactants. The SCFE fractions that contained only sats., aroms., and resins gave a low yield of carbon on the **catalyst** (<7.5 wt %). The asphaltene-rich fraction gave higher coke yields, both on the **catalyst** and in the reactor, and a lower H/C ratio than the lighter fractions. In the worst case with asphaltene-rich feed, over half of the surface area and pore vol. of **catalyst** was lost due to coke deposition on the **catalyst**. HDS activity of the spent **catalyst** decreased monotonically with increasing carbon content on the **catalyst**. A portion of the carbonaceous material, or coke, on the **catalyst** was mobile and reactive at the conditions used for hydroprocessing of bitumen. The data suggested that this mobile adsorbed material had a significant impact on the obsd. activity of the **catalyst**.  
 ST hydroprocessing **catalyst** coking bitumen residue  
 IT Hydrodesulfurization  
 Petroleum hydrotreating **catalysts**  
 (coking of hydroprocessing **catalyst** by residue fractions of bitumen)  
 IT Asphaltenes  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (coking of hydroprocessing **catalyst** by residue fractions of bitumen)  
 IT 7440-02-0, **Nickel**, uses  
 RL: CAT (Catalyst use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
 (contg. molybdenum and alumina; coking of hydroprocessing **catalyst** by residue fractions of bitumen)  
 IT 7439-98-7, Molybdenum, uses  
 RL: CAT (Catalyst use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
 (contg. **nickel** and alumina; coking of hydroprocessing

**catalyst** by residue fractions of bitumen)  
IT 132-65-0, Dibenzothiophene  
RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(hydrodesulfurization activity of coked hydroprocessing  
**catalyst**)

RE.CNT 16

RE

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- (2) Carruthers, J; Chem Ind 1994, V58, P175 HCAPLUS
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- (6) De Jong, K; Ind Eng Chem Res 1994, V33, P821 HCAPLUS
- (7) Girgisz, M; Ind Eng Chem Res 1991, V30, P2021
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L5 ANSWER 10 OF 18 HCAPLUS COPYRIGHT 2001 ACS

AN 1998:760096 HCAPLUS

DN 130:15125

TI Method for continuous catalytic reaction of organic compounds

IN Tacke, Thomas; Roeder, Stefan; Beul, Inge; Laporte, Steffen

PA Degussa A.-G., Germany

SO Ger. Offen., 16 pp.

CODEN: GWXXBX

DT Patent

LA German

IC ICM C07B035-02

ICS C07C053-126; C07C051-36; C07C069-22; C07C069-24; C07C069-30;  
C07C067-303; C07C067-02; C07C067-08; C11C003-12; C07B041-12

ICA C07B041-06; C07B037-04

CC 45-3 (Industrial Organic Chemicals, Leather, Fats, and Waxes)

Section cross-reference(s): 48

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	DE 19719431	A1	19981119	DE 1997-19719431	19970512
	EP 878534	A2	19981118	EP 1998-104688	19980316
	EP 878534	A3	20000202		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	US 6316646	B1	20011113	US 1998-73810	19980507
	JP 10316592	A2	19981202	JP 1998-128678	19980512
PRAI	DE 1997-19719431	A	19970512		
AB	The process, esp. for hydrogenation of fats and their derivs., involves extn. of reactants from an impure feed with a condensed fluid (e.g., <b>supercrit.</b> CO2), passage of the ext. over a <b>catalyst</b> under reaction conditions, sepn. of the products from the unchanged reactants and extractant, and recycle of the latter. Thus, a crude fatty				

acid mixt. was extd. into 27:5 CO<sub>2</sub>-propane at 80.degree./200 bars and the ext. was passed over a **catalyst** of Pd supported on a functionalized polysiloxane at 140-190.degree./200 bars (temp. increasing in stages to compensate for loss of **catalyst** activity) and liq. hourly space velocity .apprx.1 for .apprx.240 h to produce fatty acids with I no. 1-2 at a throughput of .apprx.800 g/g **catalyst**.

ST fatty acid continuous hydrogenation; liquefied gas medium hydrogenation fat

IT Alcohols, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(C1-6, solubilizers; continuous catalytic reaction of org. compds.)

IT Platinum-group metals  
RL: CAT (Catalyst use); USES (Uses)  
(**catalysts**; continuous catalytic hydrogenation of org. compds.)

IT Hydrogenation  
(continuous catalytic hydrogenation of org. compds.)

IT Fats and Glyceridic **oils**, reactions  
Fatty acid esters  
Fatty acids, reactions  
RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process)  
(continuous catalytic hydrogenation of org. compds.)

IT Extraction  
(continuous catalytic reaction of org. compds. after)

IT 7440-02-0, **Nickel**, uses 7440-05-3, Palladium, uses 7440-50-8, Copper, uses  
RL: CAT (Catalyst use); USES (Uses)  
(**catalysts**; continuous catalytic hydrogenation of org. compds.)

IT 544-35-4, Ethyl linoleate  
RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process)  
(continuous catalytic hydrogenation of org. compds.)

IT 74-84-0, Ethane, uses 74-98-6, Propane, uses 106-97-8, Butane, uses 124-38-9, Carbon dioxide, uses 10024-97-2, Nitrogen oxide (N<sub>2</sub>O), uses  
RL: NUU (Nonbiological use, unclassified); USES (Uses)  
(liquefied, extractant; continuous catalytic reaction of org. compds.)

IT 67-64-1, Acetone, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(solubilizer; continuous catalytic reaction of org. compds.)

L5 ANSWER 11 OF 18 HCAPLUS COPYRIGHT 2001 ACS  
AN 1998:552505 HCAPLUS  
DN 129:247395  
TI Characteristics on HDS and HDN kinetics of narrow fractions from residua  
AU Yang, Chaohe; Du, Feng; Xu, Chunming  
CS State Key Laboratory of Heavy Oil Processing, University of Petroleum, Dongying city, 257062, Peop. Rep. China  
SO Prepr. Symp. - Am. Chem. Soc., Div. Fuel Chem. (1998), 43(3), 751-757  
CODEN: PSADFZ  
PB American Chemical Society, Division of Fuel Chemistry  
DT Journal  
LA English  
CC 51-6 (Fossil Fuels, Derivatives, and Related Products)  
AB An atm. residuum from Dagang crude of China(DGAR) and two vacuum residua from Arabian Light crude and Arabian Medium crude(SQVR and SZVR) were fractionated into 7-8 cuts by **supercrit.** fluid extn.

fractionation (SFEF) technique developed by State Key Lab. of Heavy Oil Processing. These SFEF fractions were catalytically hydroprocessed in a 100 mL autoclave with crushed com. Ni-Mo **catalyst**. The HDS and HDN diffusion-reaction model of residue in autoclave reactor was established. The diffusion and HDS and HDN characteristics of these fractions were discussed.

ST hydrodesulfurization hydrodenitrogenation kinetics narrow fraction; petroleum residue **supercrit** fluid extn

IT Diffusion  
Hydrodesulfurization  
Petroleum fractions  
Petroleum hydrotreating **catalysts**  
Petroleum refining residues  
Physicochemical simulation  
Reaction kinetics  
    **Supercritical** fluid extraction  
        (characteristics on HDS and HDN kinetics of narrow fractions from residua)

IT Petroleum refining  
    (hydrodenitrogenation; characteristics on HDS and HDN kinetics of narrow fractions from residua)

IT 7439-98-7, Molybdenum, uses 7440-02-0, **Nickel**, uses  
RL: CAT (Catalyst use); USES (Uses)  
    (characteristics on HDS and HDN kinetics of narrow fractions from residua)

L5 ANSWER 12 OF 18 HCAPLUS COPYRIGHT 2001 ACS  
AN 1998:552504 HCAPLUS  
DN 129:247394  
TI Hydroconversion characteristics on narrow fractions of residua  
AU Yang, Chaohe; Zhang, Jianfang; Xu, Chunming; Lin, Shixiong  
CS State Key Laboratory of Heavy Oil Processing, University of Petroleum, Dongying city, 257062, Peop. Rep. China  
SO Prepr. Symp. - Am. Chem. Soc., Div. Fuel Chem. (1998), 43(3), 746-750  
CODEN: PSADFZ  
PB American Chemical Society, Division of Fuel Chemistry  
DT Journal  
LA English  
CC 51-6 (Fossil Fuels, Derivatives, and Related Products)  
AB An atm. residuum from Dagang crude of China (DGAR) and two vacuum residua from Arabian Light crude and Arabian Medium crude (SQVR and SZVR) were fractionated into 7-8 cuts by **supercrit.** fluid extn.  
fractionation (SFEF) technique developed by State Key Lab. of Heavy Oil Processing. The major properties of these fractions were measured, and each fraction was catalytically hydroprocessed in a 100 mL autoclave with crushed com. Ni-Mo **catalyst** at the same reaction conditions. Removal of sulfur and nitrogen decreases with increase of  
the  
av. mol. wt. (AMW) of the feedstock, but the total conversion of heavy portion greater than 500 for every fraction is similar. The yield of  
coke  
increases with increasing AMW of feed, esp. for the several heavier fractions, and the SFEF residue inhibits the HDS and HDN of other SFEF fractions to a certain extent.

ST hydroconversion narrow fraction residue **supercrit** extn

IT Hydrodesulfurization  
Petroleum fractions  
Petroleum refining residues

**Supercritical fluid extraction**  
(hydroconversion characteristics on narrow fractions of residua)

IT Coke  
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)  
(hydroconversion characteristics on narrow fractions of residua)

IT Petroleum refining  
(hydrodenitrogenation; hydroconversion characteristics on narrow fractions of residua)

IT 7439-98-7, Molybdenum, uses 7440-02-0, **Nickel**, uses  
RL: CAT (Catalyst use); USES (Uses)  
(hydroconversion characteristics on narrow fractions of residua)

L5 ANSWER 13 OF 18 HCAPLUS COPYRIGHT 2001 ACS  
AN 1997:670757 HCAPLUS  
DN 127:295615  
TI Catalytic hydrogenating desulfurization of heavy oil through partial oxidation in **supercritical** water  
AU Adschiri, T.; Sato, T.; Shibata, R.; Arai, K.  
CS Department Chemical Engineering, Tohoku University, Sendai, 980, Japan  
SO DGMK Tagungsber. (1997), 9704(Proceedings ICCS '97, Volume 3), 1505-1508  
CODEN: DGTAFF; ISSN: 1433-9013  
PB Deutsche Wissenschaftliche Gesellschaft fuer Erdoel, Erdgas und Kohle  
DT Journal  
LA English  
CC 51-9 (Fossil Fuels, Derivatives, and Related Products)  
AB We show that the effective hydrogenating atm. can be supplied through the partial oxidn. of hydrocarbon in **supercrit.** water (SCW). We conducted expts. of dibenzothiophene (DBT) hydrogenation with NiMo/Al<sub>2</sub>O<sub>3</sub> at 673 K and 30 MPa, in various atmospheres, using a tube bomb reactor. Higher conversion of DBT was obtained in CO-SCW, CO<sub>2</sub>-H<sub>2</sub>-SCW, HCOOH-SCW than in H<sub>2</sub>-SCW. These results clearly indicate that water-gas shift reaction (CO + H<sub>2</sub>O → CO<sub>2</sub> + H<sub>2</sub>) in SCW produces the species which can hydrogenate DBT more effectively than H<sub>2</sub> gas. Next, we conducted another expt. for partial oxidn. of DBT-hexylbenzene soln. in SCW, effective hydrogenation of DBT took place. This result is probably because CO forms through the partial oxidn. of hexylbenzene and converts to the hydrogenating species through water-gas shift reaction.

ST catalytic hydrogenating desulfurization heavy oil oxidn;  
**supercrit** water oxidn dibenzothiophene hydrogenating desulfurization; water gas shift reaction hydrogenating desulfurization

IT Desulfurization **catalysts**  
Oxidation  
Water gas shift reaction  
(catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in **supercrit.** water)

IT Heavy petroleum  
RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in **supercrit.** water)

IT Desulfurization  
(hydrogenating; catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in **supercrit.** water)

IT 630-08-0, Carbon monoxide, processes  
RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in CO-**supercrit.** water system)

IT 1333-74-0, Hydrogen, processes  
RL: PEP (Physical, engineering or chemical process); PROC (Process)

(catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in CO<sub>2</sub>-H<sub>2</sub>- and H<sub>2</sub>-**supercrit.** water system)

IT 124-38-9, Carbon dioxide, processes  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in CO<sub>2</sub>-H<sub>2</sub>-**supercrit.** water system)

IT 64-18-6, Formic acid, processes  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in HCO<sub>2</sub>H-**supercrit.** water system)

IT 1077-16-3, Hexylbenzene  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in **supercrit.** water exemplified by dibenzylthiophene soln. in)

IT 7439-98-7, Molybdenum, uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in **supercrit.** water with)

IT 7440-02-0, Nickel, uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in **supercrit.** water with NiMo/Al<sub>2</sub>O<sub>3</sub> catalyst)

IT 92-52-4P, Biphenyl, preparation 827-52-1P, Cyclohexylbenzene  
 RL: PNU (Preparation, unclassified); PREP (Preparation)  
 (major product in catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in H<sub>2</sub>-**supercrit.** water)

IT 132-65-0, Dibenzothiophene  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (model compd.; catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in **supercrit.** water exemplified by)

IT 7732-18-5, Water, processes  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (**supercrit.**; catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in **supercrit.** water)

L5 ANSWER 14 OF 18 HCAPLUS COPYRIGHT 2001 ACS

AN 1995:899014 HCAPLUS

DN 123:290382

TI Hydrogenation and hardening of unsaturated fats, fatty acids or fatty acid

esters

IN Tacke, Thomas; Wieland, Stefan; Panster, Peter; Bankmann, Martin; Maegerlein, Hendrik

PA Degussa AG, Germany

SO Ger. Offen., 13 pp.

CODEN: GWXXBX

DT Patent

LA German

IC ICM C07C069-30

ICS C07C069-24; C07C067-303; C07C051-36; B01J023-72; C11C003-12

ICI C07M009-00

CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)

Section cross-reference(s): 17, 23

FAN.CNT 1

PATENT NO.

KIND DATE

APPLICATION NO. DATE

PI	DE 4405029	A1	19950824	DE 1994-4405029	19940217
	DE 4405029	C2	19960404		
	CA 2182781	AA	19950824	CA 1995-2182781	19950209
	WO 9522591	A1	19950824	WO 1995-EP456	19950209
	W: AM, AU, BB, BG, BR, BY, CA, CN, CZ, EE, FI, GE, HU, JP, KG, KP, KR, KZ, LK, LR, LT, LV, MD, MG, MN, MX, NO, NZ, PL, RO, RU, SI, SK, TJ, TT, UA, US, UZ, VN				
	RW: KE, MW, SD, SZ, UG, AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG				
	AU 9518082	A1	19950904	AU 1995-18082	19950209
	AU 677900	B2	19970508		
	EP 745116	A1	19961204	EP 1995-909690	19950209
	EP 745116	B1	19981118		
	R: BE, CH, DE, DK, ES, FR, GB, IT, LI, NL, PT, SE				
	CN 1140465	A	19970115	CN 1995-191599	19950209
	JP 09509440	T2	19970922	JP 1995-521550	19950209
	BR 9506806	A	19970930	BR 1995-6806	19950209
	ES 2126884	T3	19990401	ES 1995-909690	19950209
	US 5734070	A	19980331	US 1996-689836	19960814
PRAI	DE 1994-4405029	A	19940217		
	WO 1995-EP456	W	19950209		
AB	Edible unsatd. fats, fatty acids, or fatty acid esters are hydrogenated for hardening with H <sub>2</sub> at using Pt-group metals, Ni, or Cu on spherical 0.1-3 mm supports (ceramic foam or metal honeycomb) with promoters at a temp. of 1-10 times the solvent crit. temp. (-120 to 250.degree.) and a pressure 0.8-6 times the crit. pressure (20-200 bar).				
ST	fatty acid hydrogenation hardening				
IT	Hydrogenation <b>catalysts</b> (Pt-group metals, Ni, Cu; hydrogenation and hardening of edible unsatd. fats, fatty acids or fatty acid esters)				
IT	Siloxanes and Silicones, uses RL: NUU (Nonbiological use, unclassified); USES (Uses) (condensation polymers, <b>catalyst</b> supports; hydrogenation and hardening of edible unsatd. fats, fatty acids or fatty acid esters)				
IT	Fats and Glyceridic <b>oils</b> Fatty acids, preparation RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation) (edible unsatd.; hydrogenation and hardening of edible unsatd. fats, fatty acids or fatty acid esters)				
IT	Hardening Hydrogenation (hydrogenation and hardening of edible unsatd. fats, fatty acids or fatty acid esters)				
IT	Platinum-group metals RL: CAT (Catalyst use); USES (Uses) (hydrogenation and hardening of edible unsatd. fats, fatty acids or fatty acid esters)				
IT	Fatty acids, preparation RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation) (esters, edible unsatd.; hydrogenation and hardening of edible unsatd. fats, fatty acids or fatty acid esters)				
IT	1344-28-1, Alumina, uses 7440-44-0, Carbon, uses 7631-86-9, Silica, uses 9003-53-6, Polystyrene 13463-67-7, Titania, uses RL: CAT (Catalyst use); USES (Uses) ( <b>catalyst</b> support; hydrogenation and hardening of edible				

unsatd. fats, fatty acids or fatty acid esters)

IT 7440-02-0, **Nickel**, uses 7440-50-8, Copper, uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (hydrogenation and hardening of edible unsatd. fats, fatty acids or  
 fatty acid esters)

IT 544-35-4P, Linoleic acid ethyl ester  
 RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation)  
 (hydrogenation and hardening of edible unsatd. fats, fatty acids or  
 fatty acid esters)

IT 1333-74-0, Hydrogen, reactions  
 RL: RCT (Reactant)  
 (hydrogenation and hardening of edible unsatd. fats, fatty acids or  
 fatty acid esters)

IT 74-98-6, Propane, uses 109-66-0, Pentane, uses 124-38-9, Carbon  
 dioxide, uses 10024-97-2, Dinitrogen monoxide, uses 10102-43-9,  
 Nitrogen monoxide, uses  
 RL: NUU (Nonbiological use, unclassified); USES (Uses)  
 (**supercrit.**; hydrogenation and hardening of edible unsatd.  
 fats, fatty acids or fatty acid esters)

L5 ANSWER 15 OF 18 HCAPLUS COPYRIGHT 2001 ACS  
 AN 1993:127921 HCAPLUS  
 DN 118:127921  
 TI Titania-zirconia mixed oxide aerogels as supports for hydrotreating  
**catalysts**  
 AU Weissman, J. G.; Ko, E. I.; Kaytal, S.  
 CS Texaco Inc., P.O. Box 509, Beacon, NY, USA  
 SO Appl. Catal., A (1993), 94(1), 45-59  
 CODEN: ACAGE4  
 DT Journal  
 LA English  
 CC 51-9 (Fossil Fuels, Derivatives, and Related Products)  
 Section cross-reference(s): 49, 67

AB **Supercrit.** fluid (SFC) extn. was used to make aerogels of TiO<sub>2</sub>,  
 ZrO<sub>2</sub>, and two TiO<sub>2</sub>-ZrO<sub>2</sub> mixed oxides with surface areas 2-5 times greater  
 than their conventionally prepd. equiv.; addnl. the mixed oxides had  
 higher surface acidities than the two single component oxides. Heat  
 treatments, either during **catalyst** prepn. or reactor testing,  
 always resulted in small-to-significant decreases in surface areas in the  
 aerogel-contg. samples. These samples were used as supports for Mo-Ni  
**catalysts** for the hydroprocessing of gas oil in a  
 pilot-plant scale reactor. The high-ZrO<sub>2</sub> materials were unstable under  
 reaction conditions and nearly inactive; in contrast, the high-TiO<sub>2</sub>  
**catalysts**, while somewhat unstable, were more active on a surface  
 area basis than Al<sub>2</sub>O<sub>3</sub> or conventional TiO<sub>2</sub> equivalent supported Mo-Ni  
**catalysts**. This improvement is attributed to properties inherent  
 in the SCF-prepd. supports; these results also indicate that support  
 acidity contributes to hydrotreating activity.

ST gas oil hydroprocessing **catalyst** support; molybdenum  
**nickel** hydroprocessing **catalyst**; titania zirconia  
 support prepn **supercrit** extn

IT Gas oils  
 (hydroprocessing of, **catalyst** for, molybdenum-**nickel**  
 on titania-zirconia aerogel as)

IT Aerogels  
 (titania-zirconia, support, for molybdenum-**nickel**  
**catalysts**, for hydroprocessing of gas oil)

IT Petroleum refining **catalysts**

(hydroprocessing, molybdenum-**nickel**, on titania-zirconia aerogel, for hydroprocessing of gas oil)

IT 1314-23-4P, Zirconia, uses  
 RL: PREP (Preparation)  
 (aerogel, contg. titania, prepn. of, by **supercrit.** fluid extn., as support for molybdenum-**nickel** hydroprocessing **catalyst**)

IT 13463-67-7P, Titania, uses  
 RL: PREP (Preparation)  
 (aerogel, contg. zirconia, prepn. of, by **supercrit.** fluid extn., as support for molybdenum **nickel** hydroprocessing **catalyst**)

IT 7440-02-0, **Nickel**, uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (**catalyst**, contg. molybdenum, on titania-zirconia aerogel, for hydroprocessing of gas oil)

IT 7439-98-7, Molybdenum, uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (**catalyst**, contg. **nickel**, on titania-zirconia aerogel, for hydroprocessing of gas oil)

L5 ANSWER 16 OF 18 HCAPLUS COPYRIGHT 2001 ACS  
 AN 1990:182671 HCAPLUS  
 DN 112:182671  
 TI Chemical structure and susceptibility to hydrogenation of heavy coal derived liquids  
 AU Surygala, J.; Sliwka, E.  
 CS Inst. Chem. Tech. Pet. Coal, Tech. Univ. Wroclaw, Wroclaw, 50-344, Pol.  
 SO Proc. - Annu. Int. Pittsburgh Coal Conf. (1989), 6th(2), 711-18  
 CODEN: PICNE4  
 DT Journal  
 LA English  
 CC 51-21 (Fossil Fuels, Derivatives, and Related Products)  
 Section cross-reference(s): 67

AB Six coal liqs., 3 flash pyrolysis tars, 2 **supercrit.** exts., and a hydrogenated anthracene **oil** ext., were analyzed for their compn., and a no. of **catalysts** for the hydroprocessing of these liqs. were evaluated. The brown-coal exts. and tars had relative high concns. of H (8-9%) and O (8-12%), but their arom. C concns. were relatively low (0.4-0.5). The coal exts. had less H (6-7%) and O (4-5%) but more arom. C (0.7-0.8). A Co-Mo/Al<sub>2</sub>O<sub>3</sub> **catalyst** was suitable for brown-coal liq. hydroprocessing, but Ni-Mo/Al<sub>2</sub>O<sub>3</sub> and Ni-Co-Mo/Al<sub>2</sub>O<sub>3</sub> **catalysts** were more suitable for the coal liqs.

ST coal brown liq compn hydroprocessing; ext pyrolysis tar **catalyst** hydroprocessing

IT Coal liquids  
 (brown, hydroprocessing of, **catalysts** for)

IT Coal liquids  
 (exts., hydroprocessing of, **catalysts** for)

IT Petroleum refining **catalysts**  
 (hydroprocessing, of coal liqs., evaluation of)

IT Coal liquids  
 (pyrolysis **oils**, hydroprocessing of, **catalysts** for)

IT 7439-98-7, Molybdenum, uses and miscellaneous  
 RL: CAT (Catalyst use); USES (Uses)  
 (**catalyst**, contg. cobalt and **nickel** and alumina, for coal liq. hydroprocessing)

IT 7440-48-4, Cobalt, uses and miscellaneous

RL: CAT (Catalyst use); USES (Uses)  
 (catalyst, contg. molybdenum and nickel and alumina, for coal liq. hydroprocessing)  
 IT 7440-02-0, Nickel, uses and miscellaneous  
 RL: CAT (Catalyst use); USES (Uses)  
 (catalysts, contg. cobalt and molybdenum and alumina, for coal liq. hydroprocessing)  
 IT 1317-39-1, Cuprous oxide, uses and miscellaneous 7439-89-6, Iron, uses and miscellaneous 12627-71-3, Tungsten sulfide  
 RL: CAT (Catalyst use); USES (Uses)  
 (catalysts, for coal liq. hydroprocessing)

L5 ANSWER 17 OF 18 HCAPLUS COPYRIGHT 2001 ACS  
 AN 1986:227641 HCAPLUS  
 DN 104:227641  
 TI Selective extraction of hydrocarbons from asphaltic petroleum oils  
 IN Yan, Tsoung Yuan; Audeh, Costandi A.  
 PA Mobil Oil Corp., USA  
 SO Can., 18 pp.  
 CODEN: CAXXA4  
 DT Patent  
 LA English  
 IC ICM C10G021-00  
 CC 51-10 (Fossil Fuels, Derivatives, and Related Products)  
 FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CA 1198996	A1	19860107	CA 1982-407675	19820720

AB Petroleum residues are deasphalted by extn. with a low mol. wt. org. solvent (crit. temp. .gtoreq.200.degree.C) at or above the crit. temp. and crit. pressure of the solvent. The asphaltenes and metal contaminants are agglomerated and sepd.; the ext. is then fractionated to recover a deasphalted oil and the solvent. Catalysts can be added during the extn. to improve the deasphalted oil yield and to reduce metal content. Thus, a vacuum residue (contg. 22 ppm Ni and 220 ppm V) was extd. with a catalytically cracked gasoline at 725.degree.F and 650 psig to form an asphaltic heavy phase and a deasphalted oil -solvent ext. phase; the ext. phase was sepd. and distd. to recover the deasphalted oil and the solvent. The product contained 76 wt.% deasphalted oil with 2 ppm Ni and 12 ppm V.  
 ST petroleum refining deasphalting solvent extn; gasoline extn petroleum residue deasphalting; **supercrit** deasphalting demetalation petroleum residue; asphaltene demetalation demetalation petroleum residue;  
 nickel removal demetalation petroleum residue; vanadium removal demetalation petroleum residue  
 IT Gasoline  
 RL: USES (Uses)  
 (catalytically cracked, **supercrit.** extn. solvent, for deasphalting and demetalation of petroleum residues)  
 IT Asphaltenes  
 RL: REM (Removal or disposal); PROC (Process)  
 (removal of, from petroleum refining residues, by **supercrit.** extn. with catalytically cracked gasoline)

IT Solvent naphtha  
 (supercrit. extn. of, for deasphalting and demetalation of petroleum residues)

IT Petroleum products  
 (cycle oils, supercrit. extn. solvents, for deasphalting and demetalation of petroleum residues)

IT Petroleum refining  
 (deasphalting-demetalation, of vacuum residues, by extn. with supercrit. solvents)

IT Petroleum refining residues  
 (vacuum distn., deasphalting and demetalation of, by supercrit. extn. with catalytically cracked gasoline)

IT 7440-02-0, uses and miscellaneous 7440-62-2, uses and miscellaneous  
 RL: REM (Removal or disposal); PROC (Process)  
 (removal of, from petroleum refining residues, by supercrit. extn. with catalytically cracked gasoline)

IT 67-56-1, uses and miscellaneous 109-66-0, uses and miscellaneous  
 RL: USES (Uses)  
 (supercrit. extn. solvent, for deasphalting and demetalation of petroleum residues)

IT 71-43-2, uses and miscellaneous 108-88-3, uses and miscellaneous  
 RL: USES (Uses)  
 (supercrit. extn. solvents, for deasphalting and demetalation of petroleum residues)

L5 ANSWER 18 OF 18 HCAPLUS COPYRIGHT 2001 ACS  
 AN 1983:542956 HCAPLUS  
 DN 99:142956  
 TI Hydrotreating **supercritical** solvent extracts in the presence of alkane extractants  
 IN Low, Jim Y.  
 PA Phillips Petroleum Co. , USA  
 SO U.S., 4 pp.  
 CODEN: USXXAM  
 DT Patent  
 LA English  
 IC C10G001-04; C10G021-14  
 NCL 208011000LE  
 CC 51-13 (Fossil Fuels, Derivatives, and Related Products)  
 Section cross-reference(s): 67

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	US 4397736	A	19830809	US 1981-249804	19810401
	US 32120	E	19860422	US 1984-572713	19840120
PRAI	US 1981-249804		19810401		

AB Hydrocarbons are recovered from naturally-occurring carbonaceous materials

of low org. C content (i.e., oil shale and/or tar sand) by contacting the materials under **supercrit.** conditions with a mixt. of structurally analogous hydrocarbon solvents. The solvents comprise .gtoreq.1 arom. solvent and .gtoreq.1 cycloaliph. solvent, with the latter being structurally analogous to the arom. solvent and comprising 5-10 wt.% of the total solvent wt. The carbonaceous material can be hydrotreated in the presence of the solvent mixt. either during or after the extn. step. Thus, Paraho shale oil (1 wt. part) was dissolved in 4 wt. parts solvent and hydrotreated at 850 .degree.F, 1.6 h-1 liq. space velocity, and 300 h-1 H space velocity over Mo-Ni. When

PhMe [108-88-3] was the solvent, .apprx.5-7% of the PhMe was hydrogenated to methylcyclohexane (I) [108-87-2]. When the solvent comprised PhMe contg. 5% I, very little solvent was hydrogenated, H consumption was substantially reduced, and conversion was increased.

ST shale oil hydrotreating **supercrit** solvent; toluene **supercrit** solvent hydrotreating oil; methylcyclohexane **supercrit** solvent hydrotreating oil; molybdenum nickel catalyst hydrotreating oil; oil shale sand **supercrit** extn

IT Oil sand  
Oil shale  
RL: PROC (Process)  
(extn. of, by **supercrit.** solvent mixts.)

IT Petroleum recovery  
(from oil sand and oil shale, by extn. with **supercrit.** solvent mixts.)

IT Petroleum refining **catalysts**  
(hydrorefining, molybdenum-nickel, for shale oils in **supercrit.** mixed solvents)

IT Petroleum refining  
(hydrorefining, of shale oils in mixed solvents under **supercrit.** conditions)

IT 7440-02-0, uses and miscellaneous  
RL: CAT (Catalyst use); USES (Uses)  
(**catalysts**, contg. molybdenum for hydrorefining of shale oils in **supercrit.** mixed solvents)

IT 7439-98-7, uses and miscellaneous  
RL: CAT (Catalyst use); USES (Uses)  
(**catalysts**, contg. nickel for hydrorefining of shale oils in **supercrit.** mixed solvents)

IT 71-43-2, uses and miscellaneous 108-87-2 108-88-3, uses and miscellaneous 110-82-7, uses and miscellaneous  
RL: USES (Uses)  
(solvents contg., shale oil hydrorefining in presence of, under **supercrit.** conditions)